the eye

Taifun®

Dear customer,

Thank you for purchasing the Taifun power source "the eye".

For the intended use of the device, it is important that you familiarize yourself with the safety information, features and technical data of the device.

In developing this unit, the following points were a top priority:

- ✔ A lowest possible contact resistance between the battery and the circuit board respectively the circuit board and the evaporator unit. This guarantees high output power and high efficiency, which means a maximum use of the battery.
- ✔ High quality materials (stainless steel) for the longest possible life and feel of the device
- ✔ High quality components (polymer tantalum - and ceramic capacitors exclusively, Kelvin shunt, etc.)
- ✔ A highly accurate control depending on your preferences (power, voltage and current control)
- ✔ A high quality of the DC voltage at the output
- ✔ An accurate measurement of the resistance
- ✔ High ease of use by simple menu navigation (with as few keystrokes as possible)

Although easy to use for the "normal" user, the Taifun is also sufficient for the technically minded (display of automatic engagement in case of exceeding the set value or permissible parameters, voltage measurement under load and no-load, automatic conversion of the parameters when changing the control mode, battery warning and cut-off threshold editable, 2 hot start modes).

We wish you to spend a long and comfortable time with this unit.

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SAFETY INSTRUCTIONS

1. Please read these instructions carefully! The manufacturer is not liable for any damage caused by improper use.
2. The device is not suitable for children or people with limited power of comprehension. Keep the device away from these people! This device is not a toy!
3. The evaporator coil gets hot (red hot). Turn on the device fully assembled only. Fire and burn hazard!
4. Do not operate the unit in an environment that is near or around flammable gases, vapors or dusts! Danger of explosion!
5. Use only **ONE** approved **battery** for this unit!
6. The battery is heavily loaded during operation. Using **unsuitable batteries can cause short circuits** with consequences such as **fire or explosion**!
7. Follow the safety instructions of the battery manufacturer!
8. Pay special attention on deformation, smell or smoke emission of the battery!
9. There is a danger of explosion or fire in case of a faulty battery!
10. Keep the device dry!
11. Keep the device away from heating elements!
12. Do not apply electrical voltage to the device!
13. The device is only intended to provide a regulated voltage to an evaporator unit, for the purpose of a so-called "e-cigarette"!
14. Any other use is neither permitted nor covered by the warranty!
15. This device is neither a medical device, nor it is suitable for such purposes!
16. Due to the large number of different usable batteries and evaporator units any liability claims against the manufacturer are excluded!
17. For all personal injury and property damage that are caused by improper use, the operator is responsible, not the manufacturer!
18. Despite extensive automatic functions to ensure trouble-free operation, all operating and connection errors are beyond our control. For damages arising out of it, we can assume no liability!
19. The manufacturer is not liable for damaged evaporators!

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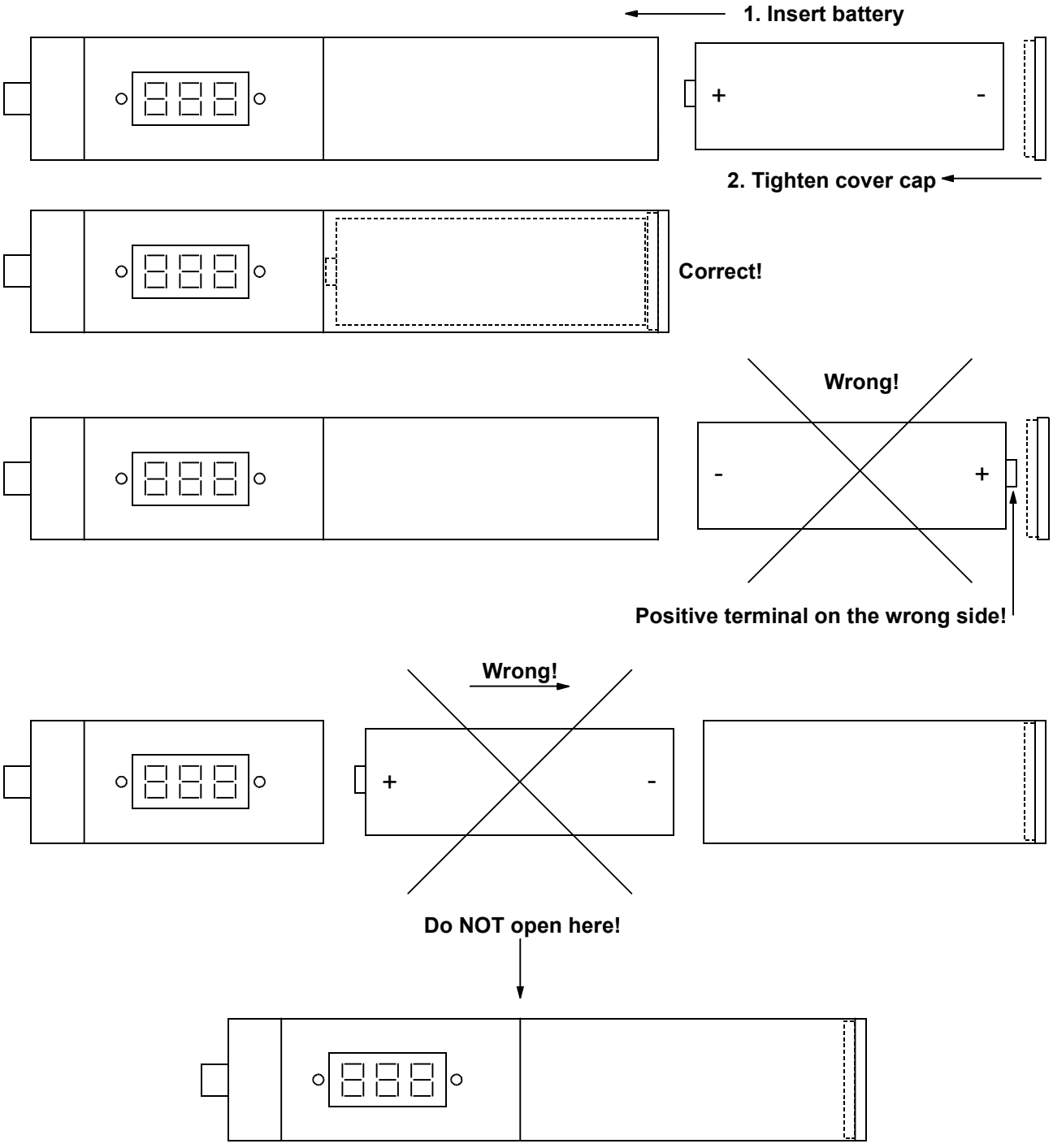
THE BATTERY

Please use only **ONE** unprotected Li-battery with a raised positive terminal ("nipple") as reverse voltage protection, like Samsung INR18650-29E (with "nipple", unprotected).

Insert the battery into the tube with the positive terminal ahead! If you insert it wrongly, the device does not work, but device and battery are not damaged!



The quality of the battery plays the most important role in the operation of the Taifun. The battery should be able to provide a current of at least 8 amps (A)!

The internal resistance of the battery should be as small as possible, which is usually seen by a high output current capability of the battery. A battery that can provide 15 amps according to the manufacturer usually has a lower internal resistance than a battery that can provide "only" 8 or 10 amps.

You recognize the quality **(or condition with respect to charge and aging)** of the battery by the fact that its voltage does not vary a lot between idle and load operation. Of course the battery should maintain the voltage for a long time.

Common Example (the voltages do NOT need to match your values shown in the menu!):

No-load voltage n = 3.8 volt (V)

voltage with load (e.g. at a output power of 15 watts) b = 3.4 volt

Spread = 0.4 volt

The Spread (of 0.4 volt) is an indication for the battery under **exactly the current** load!

Generally: The lower the difference, the lower the internal resistance of the battery. This on the premise of an optimal contact between battery and circuit board. The better the contact, the lower the measured voltage drop!

When the voltage difference increases between idle and load, check the following:

1. Is the battery charged sufficiently?
2. Are the contacts of the screw cap and the battery clean?
3. Do you have the screw cap SUFFICIENTLY tightened (without violence)?

The best possible contact between battery and battery carrier is of central importance and during the development of the device a top priority!

If necessary, replace the battery and clean the contacts!

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TECHNICAL DATA

Supply voltage Ui (automatically monitored)	One single unprotected Li-battery with min. 2.8 volt and max. 4.6 volt under load!
Output voltage Uo (automatically monitored)	Adjustable between 2.5 volt and 8.0 volt in U-mode Up to 8.0 volt in I- and P-mode The output voltage is not more than twice the supply voltage (e.g. Ui = 3.7V → Uo max. = 7.4V)
Output current Io (automatically monitored)	Adjustable between 1.5 and 5.0 Ampere in I-mode Up to 5.0 amps in U- and P-mode (7.8 amps in hot start, but max. 24 watt)
Output power Po (automatically monitored)	Adjustable between 5.0 and 24.0 watt in P-mode Up to 24.0 watt in U- and I-mode
Evaporator resistance Ro (automatically monitored)	Supported are 0.7 to 6.0 ohms
Standby current	~0.5 milliampere (standby or after 2 seconds without operation)
Hot start	2 levels
Display	three-digit 7-segment LED-Display
Control	Silent button with gold contacts for long lifetime
Key illumination	bi-colored (red / green)
Control modes	Power control (P-mode) in 0.5 watt steps Voltage control (U-mode) in 0.1 volt steps Current control (I-mode) in 0.1 amp steps (automatic conversion when changing the control mode)
Alarm threshold for low battery power	2.9 - 3.6 volt in 0.1 volt steps
Cut-off threshold for low battery power	2.8 - 3.5 volt in 0.1 volt steps (Please note the battery manufacturers cut-off voltage!)
Resistance measurement	Integrated resistance measurement in 0.1 ohms (rounded!)
Voltage measurement	Idle and with current load in 0.1 volt steps
Degree of efficiency	Depending on the load between 86% and 95%
Safety mechanisms	Reverse battery protection Integrated over-temperature protection Unintended trigger guard (Standby)

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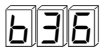
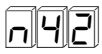
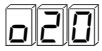
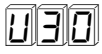
MENU OPERATION

Press the control button four times in a row to get to the menu. The 3-digit display shows first a letter for the menu item (red) and directly behind it the respective value (green). In the menu you can:

- Go to the next menu item by briefly pressing the button
- Set the currently displayed value by holding the key for about 2 seconds (see section "Menu settings")

After the last menu item the menu starts again from the beginning, but the “standby” is no longer displayed. If no key is pressed for about 5 seconds in the menu, the menu will be exited automatically. Following an overview of the menu items and their functions:

Menu item	Letter	Value	Description
standby 	-	OFF, or On	Switches the device off, or on again. This avoids that the unit doesn't start to work unintentionally while it's being transported. **Display "OFF"** The Taifun is currently ready for use. Pressing the button for about 2 seconds will turn it off. **Display "On"** The Taifun is currently turned off. Pressing the button for about 2 seconds will turn it on and the menu will be exited.
battery voltage 	b	2.5V – 6.0V	Last **in operation measured battery voltage**. A display of, for example, "b3.6" means 3.6V. If "b0.0" is displayed, there is no measurement result since the last battery change. You can't make any changes in this menu item!
no load voltage 	n	2.5V – 6.0V	Current **battery voltage with no load** (Display turned on). A display of, for example, "n4.4" means 4,4V. Together with the battery voltage it serves as an indication of charge level and quality of the battery. You can't make any changes in this menu item!
atomizer **o**hms 	o	0.7Ω – 6.0Ω	Here the resistance of the currently connected vaporizer is displayed. The resistance is measured directly when the menu item is selected. During the measurement, the display shows "o--". The **valid range** for operation is **between 0.7Ω and 6.0Ω**. In case of a short-circuit "o0.0" is displayed. If "o--" stays on the display after about 1 second, no vaporizer is connected or the contact is broken. You can't make any changes in this menu item!
set point  	P, U, or I	5W – 24W 2.5V – 8.0V 1.5A – 5.0A	Operating power (P), voltage (U) or current (I). Here you can set the desired value for the operation. What value do you prefer as the desired value, you can select in the menu item "Function". The default setting from the factory is the voltage (U) with 3.0V. **Power (P) in Watt (W)** The power can be adjusted in 0.5W steps. Above 10W, only the first two digits are displayed. A display of, for example, "P7.5" is 7.5W. 12.0W are displayed as "P12" and 12.5W as "P12.".

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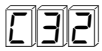
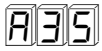
Menu item	Letter	Value	Description
			Voltage (U) in Volt (V), Current (I) in Ampere (A) Voltage and current can be adjusted in steps of 0.1V and 0.1A. "U6.0" means 6.0V; "I2.5" is 2.5A.
Hot start 	H	0, 1, or 2	In hot-start the Taifun increases the output power to 150%, in order to heat up the coil more quickly. Default setting: "0". **Hot-start 0 ("H 0")** The hot-start is turned off. No increased output power **Hot-start 1 ("H 1")** Hot-start level 1: Increased output power for 0.5sec. **Hot-start 2 ("H 2")** Hot-start level 8: Increased output power for 0.8sec. **Note:** The Overdrive is only possible within the absolute operation limits! With a setting of, for example, (close to) 8.0V as the set point, the hot-start does not affect the operation!
Function 	F	P, U, or I	With this menu item you can decide which control mode you want to use. When you change the function, the current set value is automatically converted. The Taifun supports power ("F P"), voltage ("F U") and current ("F I"). Default setting: "F U".
Cut-off threshold 	C	2.8V – 3.5V	The cut-off threshold is the voltage at which the Taifun turns itself off to **protect the battery**. Select a higher value, so the battery will last longer. With a lower value, the operating time is extended until the next battery change. Factory setting: 3.2V. **Note battery manufacturers cut-off voltage!** A **long, red flashing** will occur before device shuts off. The device then remains switched off until the battery is changed.
Alarm threshold 	A	2.9V – 3.6V	When the battery voltage falls below this value, the Taifun "warns" you that a **battery change is pending soon**. It signals this by switching the **button illumination** to **red** during operation. Default setting: 3.5V.
Light 	L	0, 1, or 2	Use this menu item to control whether and how the button is illuminated when pressed. Factory setting: "2". **Button illumination 0 ("L 0")** The button is not illuminated during operation, unless the Taifun is operated at its upper limits (see also section "Messages"). **Button illumination 1 ("L 1")** The button is only illuminated in red when the battery voltage falls below the alarm threshold. **Button illumination 2 ("L 2")** The button is always illuminated. Green during normal operation, red for below the alarm threshold.

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MENU SETTINGS

All menu items with a capital letter can be set.

- By holding the button (about 2 seconds) the setup mode starts and the first digit in the display will flash the letter "**u**" (for **u**p). Each further, short push will now increment the value within the allowed limits. According to the highest value will automatically follow the lowest
- By not pressing the button for 3 seconds the device will leave the setup mode and save the currently displayed value. You are now again in the menu
- Press the button in the menu for about 4 seconds, or in the setting mode for about 2 seconds and the first digit in the display will flash the letter "**d**" (for **d**own). Each additional, short key press then decreases the value. After the lowest value automatically follows the highest
- By not pressing the button for 3 seconds the device will leave the setup mode and save the currently displayed value. You are now again in the menu

If you have changed a value, the menu is already exited 2.5 seconds (instead of 5 seconds) after leaving the setup mode and you are back to the "normal" mode of operation.

BUTTON ILLUMINATION

The control button is illuminated in two colors, red and green. Whether and how the button is illuminated when pressed, can also be set in the menu (see the menu item "button illumination").

Button illumination	**Description**
5 times short flashing green	The Taifun has detected a **battery change** and is now ready for use.
Green light	The Taifun is **operating normally** within its allowed limits.
Red light	The Taifun warns that the **battery** needs to be **changed soon** (see also menu items "cut-off threshold" and "alarm threshold").
Green flashing	The Taifun has turned off the vaporizer, because you have held the button for longer than 15 seconds.
Red flashing	The Taifun has turned itself off to protect the battery (see also menu item "cut-off threshold").
Green and red light (orange)	The Taifun is **operating at its limits** and can not reach the preset set point. If, for example, the menu is set to 8V and a vaporizer with 1.2Ω is connected, the maximum current would be exceeded at 6V. **The Taifun limits the power to 24W, the voltage to 8V or respectively a maximum of twice the battery voltage and the current to 5A.**
Green light with red flashing	The Taifun is operating close to its limits. The power, voltage or current limitation is activated sporadically.
Slow flashing red and green alternately	The Taifun has detected an error. The display shows the error code (see section "Error codes")

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ERROR CODES

If the Taifun detects an error where the operation can not be continued, it will display the error message on the display:

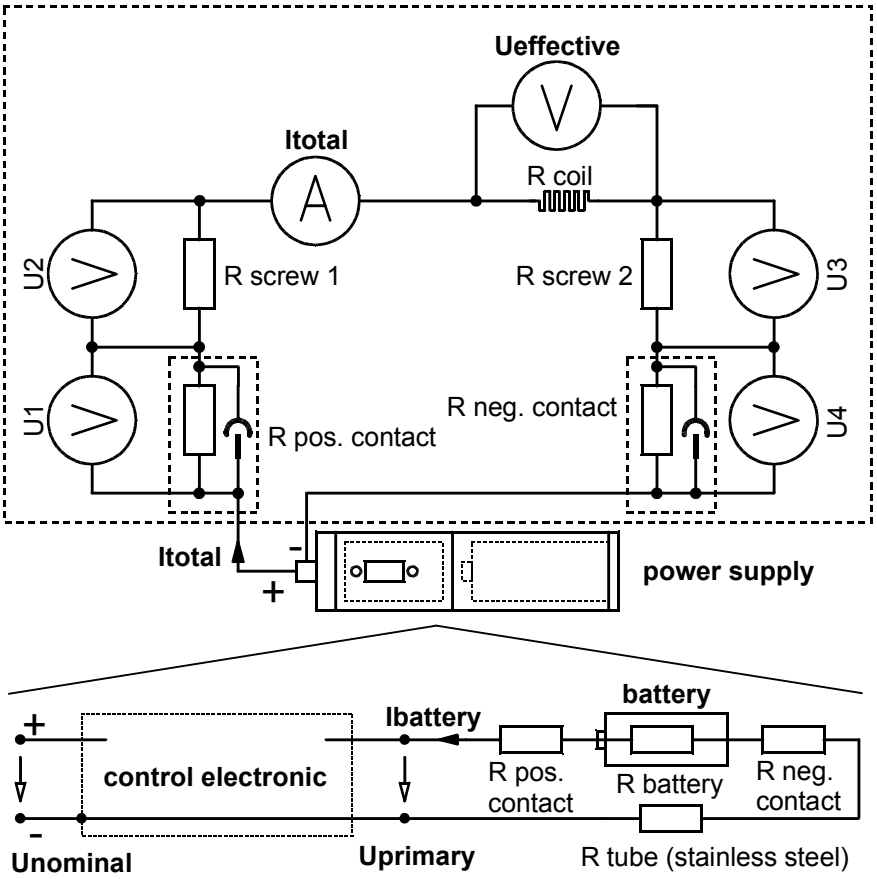
Error code	Error	Description
EAO	**E**rror **a**tomizer **o**hms	The resistance of the connected vaporizer is out of the valid range between 0.7Ω and 6.0Ω, there is no evaporator connected or the evaporator has a short circuit!
EOH	**E**rror **o**ver**h**eating	The Taifun is overheated! Please let it cool for a moment. Please check in the menu whether the vaporizer has a short circuit.
EPC	**E**rror **p**ower **c**ontrol	The power control has a defect! Please contact your specialty retailer.

TECHNICAL BACKGROUND

Dear customer,

Here are some explanations regarding the high standards for “steaming” and their implementation in this device.

These are the only formulas you need: P = U * I and U = I * R
P = electrical power in watt / U = voltage in volt / I = current in amps / R = resistance in ohms



Evaporator

With parasitical contact resistances R screw1. R screw2, R positive contact, R negative contact and the voltage drop caused by the current Itotal (U1-U4) = Itotal * R

Power supply

With parasitical contact resistances R positive contact, R negative contact and R tube

What is the problem?

1.) Low supply voltage

One problem is, that the power of up to 24 watts must be provided by a single Li-battery with a voltage range of **only** 2.8 - 4.2 volts.

If you set the output power to, for example, 24 watts (P-mode) this is the minimum power taken from the battery (please consider the loss caused by the efficiency factor).Therefore the battery has to provide a current of at least 8.6 amps!

8.6A = 24W / 2.8V (I = P / U)

This high current causes a voltage drop at the various contact points and materials. The system "loses" power that can not be converted into heat at the evaporator (see drawing). The input current is increased more to compensate the loss to maintain the same power at the output (and the degree of efficiency gets worse).

Suppose, you have a total parasitical resistance of only 0.1 ohms on the battery side, you'll get a voltage drop of 0.86 volt at this resistance.

0.86V = 8.6A * 0.1Ω (U = I * R)

This means, there is only 1.9 volt left for the control (Ubattery – Uparasitic), but the control needs at least 2.8 volts to work properly!

Even with parasitical resistance of 0.01 ohms you'll get a voltage drop of 0.086 volt, which still leads to a shut-off of the power supply. A commercially available multimeter's cable already usually has a resistance of 0.1 ohms!

If we wanted to compensate the power (from the 0.86 volt voltage loss), we would need to load the battery with a current of 12.4 amps. This, however, would cause an even greater voltage drop and so on. This "escalation" would destroy the battery or at least shorten its life drastically.

This is the reason for the minimum cut-off threshold of 2.8 volt!

This example shows very clearly, how necessary it is to reduce parasitic resistances, which inevitably exist by contacts or materials. The battery charge will last longer and the battery is less stressed!

The same problem, as described above, appears at the power supply's output (see drawing).

To limit all voltage drops caused by parasitical resistances and the current that flows through it, is a task which should not be underestimated.

You as a customer and user can help to keep the parasitical resistances low, by keeping the battery and evaporator contacts clean. Also you can tighten all screws of the evaporator, the evaporator itself and the battery's screw cap (but don't overdo it!)!

The battery's quality is important here, too. Its internal resistance is relatively high and it also varies depending on the manufacturer, type, age and state of charge.

Only if all contacts are clean and all screws are tightened (parasitical resistances) and the battery can provide the necessary current (internal resistance) the power can be supplied to the evaporator. **Otherwise you heat up anything else, but the liquid!**

2.) Low load resistor

The second problem is the relatively low coil resistor (evaporator). With such a low resistance (R coil) of 0.7 - 6.0 ohms, the parasitic resistances on the evaporator side have a greater effect.

If the parasitic resistances (R pos. contact, R screw 1. R screw 2 and R neg. contact) as described in point 1 are together 0.1 ohms and the evaporator coil, for example, is only 0.7 ohms, then only 87.5% of the power "arrives"

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at the evaporator coil! Here is an example:

Unominal shall be set to 4 volt

Rparasitic = (Rpos.contact + Rscrew1 + Rscrew2 + Rneg.contact)

Itotal = Unominal / (Rparasitc + Rcoil)

Itotal = 4V / (0.025Ω + 0.025Ω + 0.025Ω + 0.025Ω + 0.7Ω) = 5A

Uparasitic = Itotal * Rparasitic = 5A * 0.1Ω = 0.5V

The current which flows through ALL resistors (Rparasitic and Rcoil) causes a useless voltage drop of 0.5 volts! The evaporator only has 3.5 volt!

Total power Poutput = 4V * 5A = 20W

Heating power Peffective = Itotal² * Rcoil = (5A)² * 0.7Ω = 17.5W

→ 87.5% degree of efficiency on the evaporator side! **The loss is 12.5 %!**

And that's just the loss on the evaporator side. You need to add the loss of efficiency on the primary side (Li-battery see point 1) and of course the loss of the control electronics.

You see that you need a relatively high current to provide the desired power (24 watts) to the very low load resistor of (0.7 – 6.0 ohm). At the same time the high current causes a voltage drop at the intended resistor (evaporator coil) and all unintended resistors (contacts and material), which leads to a loss of power.

Simply said: You loose power at

- the evaporator's screws
- different contacts
- all metal components and conductors

Conclusion: Due to the low primary voltage of the battery with simultaneous high load, the elimination of unnecessary parasitic resistances is essential!

3.) Resistance Measurement

Since the ohmic resistance of the evaporator coil is usually in the range of 0.7 - 3.0 ohms, it is more difficult to measure these low resistance accurately. Again, smallest contact resistances have more of an impact.

To stay with our example of 0.1 ohm contact resistance, the measurement already has an error of about 14%. In addition, the rounding error of the display and the internal measuring error. A display of 0.7 ohm could mean a measured resistance of 0.65 – 0.74 ohms. And without the contact resistance 0.55 – 0.64 ohms for the coil!

All this must be taken into account if one **claims** to measure a coil resistance of, for example, 1.1 ohm.

Even if you measure a low resistance with an external milliohmmeter in the $1500 price range, it is advised to check the measurement several times. Although these devices have a zero-point correction, a 4-wire measurement (absolute requirement) and thermoelectric effect compensation (thermo EMF), the contact between the probe prod and the test item is a challenge in itself!

If someone does a comparison measurement with a normal multimeter, the result is not really comparable (mind you with the smallest resistance)! Take a look at the data sheets of the manufacturers of measuring instruments. A renowned manufacturer indicates already a correction value of 0.2 ohms for the test leads (2-wire measurement).

When in doubt it is better to measure the resistance by the voltage and current while the evaporator is mounted on the power supply. Under the condition that the power supply is sufficiently accurate.

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4.) Multiple control modes

Now we refer directly to the power supply "the eye".

The overall output power is max. 24 watts, the largest possible adjustable current is 5 amps and the largest possible adjustable voltage is twice the battery voltage under load (max. 8 volt)! We repeat the technical data in order to draw attention to the following facts.

Example 1: U-mode

If you select a voltage of, for example, 4 volt and the power supply displays a load resistance of, for example, 1 ohm, you can calculate like this:

4V / 1Ω = 4A → Within the limits!

(4V)² / 1Ω = 16W → Within the limits! All Good!

Now again, but this time with a selected voltage of 5 volt:

5V / 1Ω = 5A → Close, but within the limits!

(5V)² / 1Ω = 25W → **Above the limits**!

The device automatically reduces the voltage (so you'll have 24 watt)! The green **and** red LEDs light up as a display for an automatic intervention.

Example 2: I-mode

If you adjust the current to, for example, 3 amps and the power supply displays a load resistance of, for example, 1 ohm, you can calculate like this:

3A * 1Ω = 3V → Within the limits!

(3A)² * 1Ω = 9W → Within the limits! All Good!

Now we change the load resistance to, for example, 3 ohm. You get:

3A * **3Ω** = 9V → **Above the limits**!

(3A)² * 3Ω = 27W → **Above the limits**!

The device automatically reduces the voltage to 8 volt! (Only if the battery has a load voltage of 4 volt or more, otherwise even less):

8V / 3Ω = 2.67A → The resulting power equals (2.67A)² * 3Ω = 21.33 W!!

Please consider this! The green **and** red LEDs light up as a display for an automatic intervention.

Example 3: P-mode

Let's assume you select a power of, for example, 8 watt. Again we start with a load resistance of 1 ohm:

8W / 1Ω = (8A)² → I = 2.82A → Within the limits!

8W * 1Ω = (8V)² → U = 2.82V → Within the limits! All Good!

Now we change the load resistance. Let's take 3 ohm again:

8W / 3Ω = (2.67A)² → I = 1.63A → Within the limits!

8W * 3Ω = (24V)² → U = 4.90V → Within the limits! All Good!

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Let's change it AGAIN. Now only 0.7 ohm:

8W / 0,7Ω = (11.43A)² → I = 3.38A → Within the limits!

8W * 0,7Ω = (5.6V)² → U = 2.37V → **Below the limits!**

The device automatically increases the voltage to 2.5 volt!

P = U² / R → P = (2.5V)² / 0.7Ω = 8.93W

The green **and** red LEDs light up as a display for an automatic intervention.

Decide for yourself which type of control mode suits you best!

Finally, please consider that not only the power is essential for the amount of steam. Equally critical is the length of the evaporator coil, its cross section and the time duration after the required evaporation temperature is reached. (see Hot start function).

In other words, the heated surface of the evaporator coil with which the liquid comes in contact and which has a minimum temperature at which the liquid passes into the gaseous state and the ensuing time determines the quantity of the vapor.

Of course you can experiment with higher temperatures and other cross-sections and materials. This is probably the secret of the "Steamer" looking for the highest quality and multiple possibilities of manipulation of power supplies.

The developers

WARRANTY

We warrant the product "Taifun the eye" for a period of six months from delivery.

In case of a defect within this period, we are generally committed to restore the device into an oparational state or to rectify the defect.

The purchaser shall notify any defects to the dealer immediately.

The proof of the guarantee is to be provided to the dealer by a proper confirmation of purchase (receipt / invoice).

Damage caused by improper handling, operation, storage, incorrect connection of the device, Acts of God or other external influences are not covered by the warranty.

We assume no liability for any damages arising from the changes made by the user (manipulations). We are exempted from any such damage by the user.

Costs and risk of transportation, assembly and disassembly costs and any other costs that may be associated with the repair will not be replaced.

Liability for consequential damages resulting from erroneous functioning of the device - of any kind - is excluded.

In addition, national warranties apply.

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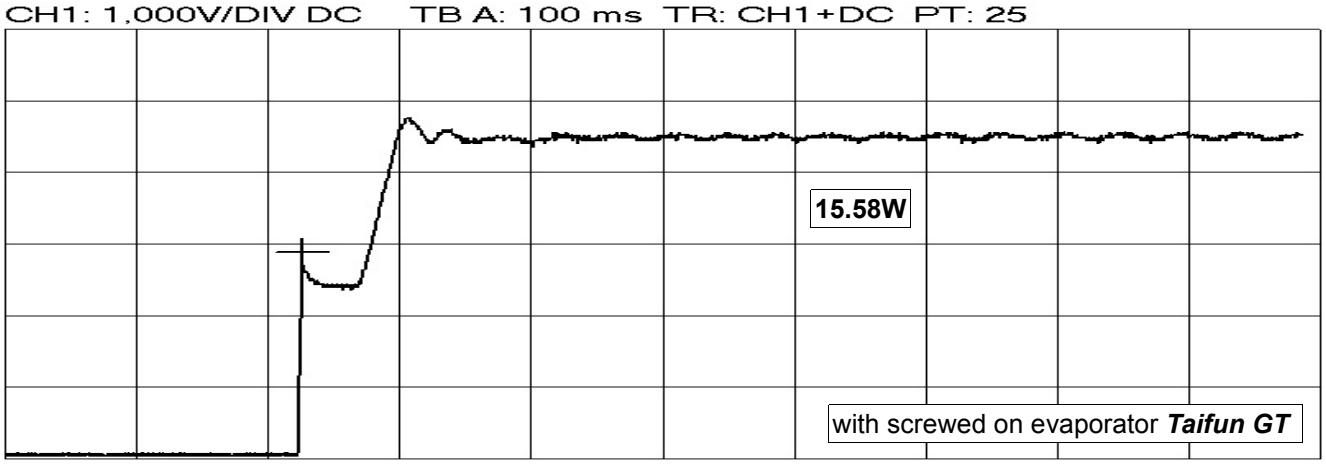
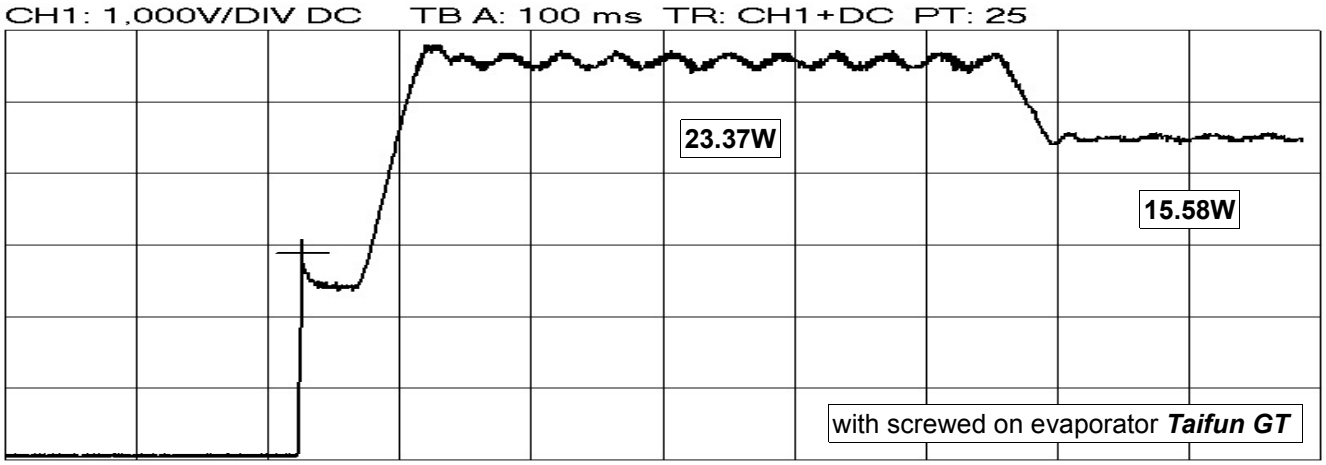
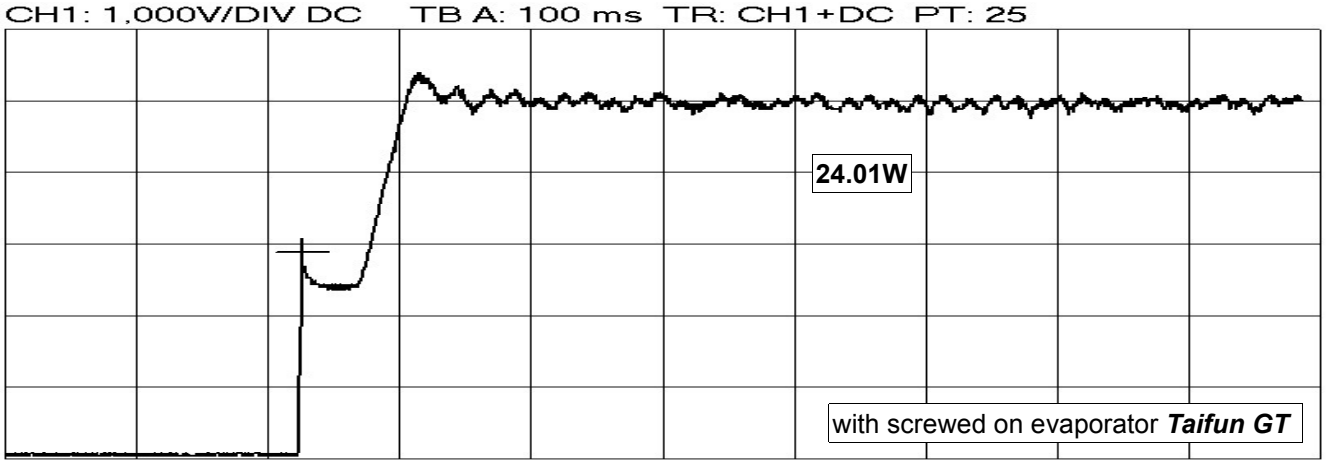
CHARTS



Output voltage 4.5 Volt (Rcoil=1.3Ω / Ubat=3.6V / Hot start off)



Output voltage 4.5 Volt (Rcoil=1.3Ω / Ubat=3.6V / Hot start level 1)



Output voltage 4.9 Volt (Rcoil=1.0Ω / Ubat=3.6V / Maximum power)

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